temperature, &c., were described by Mr. F. P. Jepson, who has thus been able successfully to confirm the observations of previous investigators. Mr. Walter E. Collinge described the part played by the Collembola, or "springtails," in the destruction of such plant life as developing seeds, bulbs, orchids, and hops. The structure of the rose-aphid *Siphonophora rosarum* was described by Mr. A. J. Grove, and Prof. E. B. Poulton exhibited a collection of predaceous insects and their prey.

The disappearance of the fresh-water crayfish from the Thames valley and other localities in this and European countries owing to the so-called "plague" is a problem of great interest to biologists. Mr. Geoffrey Smith's paper on some of the work that he has been carrying on in cooperation with Prof. Dreyer on the pathogenic bacteria of *Carcinus moenas* was of especial interest to economic biologists, as this work is connected with the question of the relation of the so-called plague bacillus to other pathogenic bacteria living on the outside of crabs, lobsters, and crayfishes.

Prof. William Somerville exhibited an interesting collection of injurious fungi and the injuries caused by the same, and a paper on the blossoming and pollen of our hardy cultivated plants, by Mr. C. H. Hooper, was communicated to the association.

On July 14 a very enjoyable excursion to the School of Forestry's arboretum at Tubney and to Bagley Woods was made. It was also resolved to accept the invitation to hold the meeting next year at the University of Manchester.

THE MUSEUMS ASSOCIATION.

THE twentieth annual conference of the Museums Association, which opened at Maidstone on July 13, attracted a fair number of members from the more southern towns, though the northern districts were not very generally represented.

Preceding the conference there was a council meeting on the evening of Monday, July 12, when the secretary and editor, Mr. E. Howarth, resigned those offices, after being editor of the *Museums Journal* since its first issue in 1901, and secretary for many years prior to that date. The formation of the association was first advocated in an article written by Mr. Howarth and published in NATURE in 1877. From that time the idea gradually extended, and in 1889 the association was duly organised at York, where it will very fitly hold its twenty-first anniversary next year.

The president, Mr. Henry Balfour, curator of the Pitt-Rivers Museum at Oxford, opened the proceedings with an extremely interesting address, which dealt cogently with the question of a national folk-museum, one of the phases of museum work that has been strangely neglected in these islands. While the ethnology of most regions of the world is illustrated in museums with profusion, the mediæval and post-mediæval life of our own country has received quite inadequate attention. Even the British Museum is everything except British so far as ethnology is concerned. The president instanced two museums, however, where praiseworthy efforts were made to illustrate local folk-culture, viz. the Museum of the Society of Antiquaries in Edinburgh and the Guildhall Museum, London. "What is required is a national folk-museum dealing exclusively and exhaustively with the history of culture of the British nation within the historic period, and illustrating the growth of ideas and indigenous characteristics. Others have, indeed, a perfect right to criticise us, for in most European countries a folk-museum is a prominent and patriotic feature of very many of their cities and towns," Berlin, Budapest, Sarajevo, Moscow, Paris, Helsingfors, Copenhagen, Bergen, Christiania, and Stockholm being cited as a few examples.

Mr. Balfour then described with some detail the Nordiska museum in Stockholm as a model upon which to base a national folk-museum of our own, and said, "I feel sure that a well-organised and carefully arranged folk-museum standing in grounds which could be adapted for an open-air exhibition would be as much appreciated by students and as popular with the masses as any institution in the country." If a strictly national collection develops as it should, and is treated upon broad scientific lines, there will be no lack of lessons that may be learnt from it. The development of culture within the geographical region would be illustrated by chronological series depicting the general life and habits of the people at successive periods. An open-air exhibition in connection with the main museum would enable obsolete types of habitations and other large structures to be erected, and admit of the exhibition of many features of the older domestic and social economy; and. further, it would supply a permanent centre for the performance of the folk-dances, songs, and old-time ceremonies of the British people.

It was rather singular that the special subject of the "arrangement of mammalia in museums," which had been selected by the council, was completely ignored, not a single paper with any reference to it being submitted, while ethnology received a large amount of attention. Mr. H. L. Braekstad supported the president's plea with a bright, descriptive paper on open-air museums in Norway, Mr. F. W. Knocker discoursed on the practical improvement of ethnographical collections in provincial museums, and Mr. W. Ruskin Butterfield offered some suggestions for loan exhibitions of local antiquities. Art museums were dealt with in thoughtful papers by Benj. I. Gilman, of the Museum of Fine Arts, Boston, and Dr. A. H. Millar, of the Albert Institute, Dundee. Other papers comprised the Maidstone Museum, by J. H. Allchin; the relation between libraries and museums, by F. Woolnough; mounting and displaying coins, by R. Quick; life-history groups of injurious insects, by H. Bolton; and a very serviceable description by Sir Martin Conway of his ingenious and convenient method of dealing with photographs.

The annual report, read at the business meeting on July 15, recorded the uninterrupted growth of the association, which now possesses a cash balance of 250*l.*, as well as a stock of publications that are constantly in demand. The ballot papers showed that Dr. Tempest Anderson had been elected president, Mr. E. E. Lowe secretary, and Mr. F. R. Rowley editor. It was decided to publish a directory of all the museums in Great Britain and the colonies, the work to be proceeded with at once by Mr. H. M. Platnauer and Mr. E. Howarth.

ADAPTATION IN FOSSIL PLANTS.[1]

THE Darwinian theory of the origin of species by variation and natural selection only fulfils its *rôle* in so far as the distinctive characters of organisms are, or have been, adaptive, *i.e.* beneficial to the species. Purely "morphological" characters (if any such exist) and non-adaptive characters in general are not explained by the Darwinian theory (or only indirectly with the help of correlation). I therefore make no apology for having a good deal to say about adaptations in what follows.

That the great bulk, if not the whole, of organic structure is of the nature of an adaptive mechanism or device cannot be seriously doubted.

The origin of species by means of natural selection does not, as has sometimes been imagined, involve a constantly increasing perfection of adaptation throughout the whole course of evolution. Darwin expressed his belief "that the period during which each species underwent modification, though long as measured by years, was probably short in comparison with that during which it remained without undergoing any change."[2]

During the long periods of rest, adaptation to the then existing condition of life must have been relatively perfect, for otherwise new variations would have had the advantage and change would have ensued. It thus appears that, as a rule, a state of equilibrium has existed in the relation of organisms to their environment, only disturbed when the conditions were changing. That such long periods of evolutionary stability have actually occurred is shown, for example, not only by the familiar case of the flora of Egypt, unaltered during a long historic period, but still more strikingly by the absence of any noticeable change

[1] Abridged from the presidential address delivered before the Linnean Society on May 24. By Dr. D. H. Scott, F.R.S.

[2] "Origin of Species," sixth edition, p. 279.

in the plants of our own part of Europe since Glacial or pre-Glacial times.

The conclusion follows that at any given time, apart from the relatively short critical periods when changed conditions had to be met, we must expect to find organisms in a state of complete adaptation to their surroundings. When physical, and especially mechanical, conditions are in question, such as have practically remained constant through all geological time, we may reckon on finding the corresponding adaptive structures essentially the same at the earliest periods as they are now.

Hence the attempt to support the Darwinian theory by the detection of imperfect mechanical adaptations in Palæozoic plants is wholly futile, as was well shown by the late Prof. Westermaier. This author's own point of view was not that of a Darwinian, but, nevertheless, his conviction that efficient adaptation has always been characteristic of living organisms is a perfectly sound one, thoroughly in harmony both with the principles of Darwin and Wallace, and with the observed facts, as far back, at any rate, as the palæontological record extends. In particular, Westermaier's contention that the construction of the Carboniferous plants followed the laws of mechanical stability and economy of material, just as is the case in plants of our own day, is completely confirmed by accurate observations on their structure, while an opponent's supposed detection of Palæozoic constructions "in direct contradiction to the principles of the engineer" merely showed that the critic had failed to distinguish between the supporting and conducting tissues of the plant. It appears to have been characteristic of Palæozoic plants that their mechanical tissues were, to a great extent, independent of the wood and concentrated in the outer cortex—the most advantageous position on engineering principles. For example, the extremely prevalent "Dictyoxylon" type of cortex, in which bands of strong, fibrous tissue, united to form a network, alternate with the living parenchyma enclosed in their meshes, was an admirable mechanical construction for stems which did not attain any great thickness by secondary growth.

In the Calamites we find, in young stems, the same alternation of fibrous and parenchymatous bands in the cortex, which is so familiar to physiological anatomists in the stems of our living horsetails.

The great tree-ferns of the later Carboniferous (if ferns they were) evidently depended for their mechanical strength on a stereome or supporting tissue quite distinct from the vascular system, and for the most part peripherally disposed, as it should be. Their power of resistance to bending strains was no doubt greatly increased by the dense external envelope of strongly constructed adventitious roots, imbedded in the cortex, a mode of support which we meet with in some monocotyledons such as Kingia (Liliaceæ) and species of Puya (Bromeliaceæ) at the present day.

When we come to the most highly organised of the Palæozoic plants, the Cordaitales, constituting the characteristic gymnosperms of that epoch, we find that the young stems had the same "Dictyoxylon" construction of the cortex as was so common among the contemporary fern-like seed-plants. The cordaitean wood, however, often assumed a dense structure, and in many cases (as also sometimes occurred among the pteridosperms) there were tangential bands of narrow fibre-like wood-elements, suggesting, though not identical with, the autumn wood of recent coniferous trees, and no doubt subserving a special mechanical function.

The exigencies of secondary growth, when occurring on a great scale, ultimately demand that the mechanical tissues should be seated in the wood, on the inner side of the growing zone, though this is not the best position on engineering principles. The old plants were, on the whole, more correct in their methods; their successors have more often had to adopt a compromise, which sacrifices a certain degree of mechanical efficiency in order to facilitate construction.

In the leaves of the Cordaiteæ we meet with remarkably perfect types of mechanical construction showing various applications of the I-girdle principle, with utilisation of the "web" for the protection of the conducting vascular strands. The construction is on the same lines as that of many of the monocotyledonous leaves investigated by Schwendener in his classical work. It will be remembered that the cordaitean leaves were originally classed as those of monocotyledons, which they closely resemble in form and mechanical requirements. Here there is no secondary growth to disturb the lines of a rational construction; the leaves were of great length and borne on lofty stems, requiring a strong mechanical system for their support, and hence we find that they present admirable illustrations of engineering principles.

Without pursuing the subject further, it may be added that other Palæozoic leaves show essentially the same types of mechanical construction as are found in leaves of corresponding shape and dimensions in the living flora.

These few illustrations may suffice to show that, from an engineering point of view, the plants of the Palæozoic were just as well constructed to resist the strains to which their organs were exposed as are their recent successors.

I have elsewhere dwelt on the gradual change in the construction of the wood, correlated with the on-coming of secondary growth, and have traced the slow extinction of the old, "cryptogamic," centripetally developed wood, as the newer, centrifugal wood, derived from a cambium, more and more effectually took its place.[1] In the former we have to do with a structure becoming vestigial, but it is interesting to note how the doomed tissue was not always left in its old age to be a mere pensioner on its more active neighbours, but was often employed, while it survived, on such work as it was still able to do. We find, in quite a number of cases,[2] that the central wood had changed its character, and shows by its structure that it had become adapted to the storage rather than to the transmission of the water-supply, its earlier function now being more conveniently left to the external parts of the wood. Such utilisation of vestigial structure appears to be a good mark of a high standard of adaptation.

Another interesting case of adaptive specialisation in an organ which may be regarded as of an old-fashioned type is to be found in the rootlets of Stigmaria. The nature of these appendages has been much disputed; last year we had an interesting discussion on the subject, opened by Prof. Weiss. I have used the word "old-fashioned" because there is some reason to suppose that these organs were not yet quite sharply differentiated as roots; at any rate, there are certain points in which they rather resemble modified leaves, though in my opinion the root-characters predominate. Though they may thus be "primitive," from the point of view of our current morphological categories, these organs, as Prof. Weiss has discovered, show a remarkable adaptive mechanism in the presence of strands of water-conducting elements running out from the central vascular bundle, and terminating in plates of tracheæ placed in the outer cortex. The whole constitutes an absorptive apparatus more elaborate than anything found in recent roots, if we except a few highly specialised haustorial roots of parasites. This example seems to me instructive, for it shows how a very high degree of adaptation may co-exist with characters which suggest a somewhat archaic type of organ.

As an example of adaptation to more special conditions, I may instance the xerophytic characters shown by various Carboniferous plants, especially in the structure of their leaves.

Though there is no question of absolute perfection in nature, it appears that, under given conditions, adaptation is and was sufficiently perfect to make it very difficult to put one's finger on any defect. When we think we can do so, it generally turns out that the defect is in the mind of the critic rather than in the organism criticised. We will take a particular case, where the history seems to give some justification for our fault-finding.

The late Palæozoic family Medulloseæ were in some respects the most remarkable plants, from an anatomical point of view, that we know of. Most of them were plants of great size, with rather sturdy stems bearing immense fern-like fronds; the habit altogether must have been something like that of a tree-fern, but their reproduction was by large seeds, borne on the fronds. To

[1] Scott, "The Old Wood and the New" (*New Phytologist*, vol. i., 1902).
[2] Megaloxylon, Zalesskya, *Lepidodendron selaginoides*.

adapt the vascular system of the stem to the supply of the large and compound leaves, the polystelic type of structure was assumed, *i.e.* the single vascular cylinder (still to be recognised in some of the earlier members of the group) became broken up, in various ways, into a number of distinct cylinders, only connected at intervals. So far the change was in the same general direction as in the evolution of the higher ferns; the fossil family, however, was not content with a complex primary vascular system, but must have secondary growth as well. Now if you have a number of vascular columns in the same stem, each growing continuously in thickness on its own account, it is evident that very special arrangements will be necessary to avoid overcrowding. The difficulty was overcome, and the Medulloseæ for some time flourished among the dominant families—the Permian formation represents their Golden age. But one is tempted to think that the system was too complicated to last; at any rate, it seems not to have lasted, for these elaborate stems have not been found in any later rocks. Either, as Mr. Worsdell supposes, the medullosean stem became reduced and simplified to form the cycadean type of stem of later days, or, as I am more inclined to believe, the family died out altogether. Even here, though we seem to have an instance of a cumbrous mechanism, over-reaching itself in elaboration, yet it worked well enough for a time, and it would be difficult to say exactly what the conditions were that led to its being superseded.

The hypothesis of "a gradual development from the simpler to the more complex" is not borne out by the facts of palæobotany—the real course of events was infinitely more involved. On a general view, as Darwin himself recognised, "the geological record does not extend far enough back to show with unmistakable clearness that within the known history of the world organisation has largely advanced."[1] This wise saying has been too often overlooked by those who have tried to popularise evolution—it is eminently true of the geological history of plants. Though there is no doubt a balance on the side of advance, due chiefly to the increasing complexity of the inter-relations among the organisms themselves, the general progress since Palæozoic days is by no means so great as has often been assumed, and we may be sure that as our knowledge of the older plants increases we shall come to form a still higher estimate than we do now of their adaptive organisation.

It has been alleged that it is the fact of the gradual appearance of higher forms which enables us to determine the relative age of strata by their fossils. So far as plants are concerned, this statement is only true to a very limited extent. A fossil angiosperm, no doubt, would be evidence of an age not earlier than the Cretaceous, but, on the other hand, a lycopod of much higher organisation than at present would establish a strong presumption of Palæozoic age; so would the higher forms of the equisetales; a cycadophyte with a fructification far more elaborate than that of recent Cycadaceæ would afford sure proof that the bed containing it belonged to the Lower Mesozoic.

Of course, much depends on the meaning we give to the words "higher" and "lower." If by "higher" we mean nearer to the recent types, then it is merely a truism to say that the higher forms are characteristic of the later rocks; but if by "higher" we mean more elaborately differentiated, then the statement quoted is, in any general sense, untrue. If, again, we imply by the word "higher" more perfectly adapted to the existing conditions, then it would be very difficult to prove any advance, for, as I have endeavoured to show, adaptation has in every age been fully adequate in relation to the then conditions. If organisms have grown in complexity, it is only where the conditions of their life have become more complex. The most striking examples of high organisation in relation to organic environment are presented by the characteristic modern subkingdom, the angiosperms, in the evolution of which, as Saporta pointed out, insect fertilisation has been the chief determining factor, leading to an infinite variety in the special adaptations of the flower, and no doubt indirectly affecting the mode of life of the whole plant. The advent of the angiosperms seems to have been almost simultaneous with that of the higher families of insects, which now, at all events, are chiefly concerned in pollination. It would be difficult to overestimate the importance of these relations in their effect on the flora of the world. If the vegetation of our own epoch appears, on the whole, definitely more advanced than that of earlier geological periods, this is probably due in a greater degree to the contemporary insect life than to any other cause.

[1] "Origin of Species," sixth edition, p. 308.

I have discussed the subject of reduction in evolution elsewhere, and will only briefly allude to it here. In many groups (lycopods, equisetales, cycadophytes) there has been a lowering of the standard of organisation, partly due to direct reduction, partly to the extinction of the higher forms in each group. There are, however, many other cases in which the simplification of particular organs means a real advance.

Taking into account all the causes which make for simplification, the question suggests itself whether, when we find a simple type of structure existing at the present day, there is any presumption in favour of its primitive nature. It has sometimes been urged that such a presumption exists (except when direct evidence of reduction can be adduced) on the ground that the general course of evolution must have been from the simpler to the more complex, a rule, as we have seen, subject to so many exceptions that, within the limited period to which the palæontological record extends, it has practically no validity. My own conviction is that in such cases there is no *presumption* of primitiveness at all, and that we should demand very strong evidence before admitting that a given simple structure is primitive. Of course, it may happen that a primitive simple type, or at least an old simple type, may have survived to our own day; this may have been the case in decaying families, where the less advanced members have had the best chance of evading the competition of ascendant races; but, on the whole, it is very unlikely that, among all the changes and chances of the world's history, a really primitive simplicity should have been preserved. "The eternal ages are long," and there has been time enough for many ups and downs on every line of descent.

The subject of reduction, so essential a clue in any attempt to trace the course of evolution, suggests a reference to the question of the simpler angiospermous flowers. While the older morphologists were wont to interpret such flowers (*e.g.* those of Aroideæ, Piperaceæ, Cupuliferæ) as reductions from more "perfect" types, there has been a tendency in more recent times to accept the simpler flowers as primitive structures from which more elaborate forms have been evolved. Quite lately, however, a reaction has set in, due to the discovery by Dr. Wieland of the wonderful bisexual flowers of the Mesozoic cycadophyta, which are constructed on the same plan (though, of course, with many differences in detail) as the more perfect angiospermous flowers, such as those of Magnoliaceæ. If the angiospermous flower was derived from a source allied to the Bennettiteæ, its evolution, as suggested by Wieland, must have been essentially a process of reduction. I only wish to point out that this view is not inconsistent with the great relative antiquity of simple and, *ex hypothesi*, reduced forms, for which, in the case of the Amentiferæ, there seems to be good geological evidence. Reduction appears to have often been a rapid, indeed a comparatively sudden, change, as shown by the frequent occurrence of much-simplified forms in the same family in which the prevailing structure is typically complete. It appears quite probable that some groups with very simple flowers, though not "primitive," may be very ancient, tracing their origin from forms which in quite early days underwent reduction (as a means of specialisation) from the highly developed flowers which probably characterised the first autonomous angiosperms.

The tentative and somewhat fragmentary observations which I have here stated tend to the following conclusions:—

(1) That at all known stages of the past history of plants there has been a thoroughly efficient degree of adaptation to the conditions existing at each period.

[1] "Darwin and Modern Science." XII. The Palæontological Record. II. Plants. (1909.)

(2) That the characters of plants, having always been as highly adaptive as they now are, natural selection appears to afford the only key to evolution which we at present possess, for all periods covered by the palæontological record.

(3) That this record only reveals a relatively short section of the whole evolution of plants, during which, though there has been considerable change, there has not been, on the whole, any very marked advance in organisation except in cases where the conditions have become more complex, as shown especially in the floral adaptations of angiosperms.

(4) That simple forms existing at the present day are, as a rule, of a reduced rather than a primitive nature, but that such reduction may have often set in at a relatively early stage of evolution, and is, therefore, consistent with a considerable degree of antiquity in the reduced forms.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. C. G. BARKLA, demonstrator and assistant lecturer in physics at the University of Liverpool, has been appointed professor of physics in King's College, London, in succession to Prof. Harold A. Wilson, F.R.S., who has accepted an appointment in McGill University, Montreal. Mr. P. H. Kirkaldy has been appointed an assistant professor in chemistry in the same college.

HARVARD has this year conferred only one honorary doctorate of science. The recipient is Mr. S. F. Emmons, of the U.S. Geological Survey. The University has conferred upon its late president, Dr. C. W. Eliot, not only the honorary LL.D., but the honorary M.D. "It has not been our custom," said the new president, Prof. Lowell, "to confer the degree of Doctor of Medicine *honoris causa*, but an exception is fitting in the case of one who, in the opinion of professors of medicine, has accomplished more for the progress of medical education in this country than any other living man, Charles William Eliot. Not in its buildings alone, but also in the instruction and research within its walls, he found our medical school brick and left it marble." At Yale the honorary D.Sc. has been conferred on Profs. E. W. Morley, W. T. Sedgwick, and E. H. Moore—a chemist, a biologist, and a mathematician respectively.

A FOURTH series of lectures on scientific microscopy is to be held at the institute for microscopy of the University of Jena from October 11–16 next. Prof. H. Ambronn will give two lectures, the first on Abbe's theory of the formation of the microscopic image, and the second on the method of testing objective systems. Dr. H. Siedentopf also will lecture twice, dealing with dark-ground illumination and ultramicroscopy. Dr. A. Köhler's two lectures have for their subjects photomicrography: (*a*) projection of the image on the plate, (*b*) illumination of the object with transmitted and incident light, and photomicrography with ultra-violet light. In connection with each lecture suitable practical work has been arranged, and demonstrations also will be provided. Application for admission to the lectures should be made to Dr. Ehlers, Jena, Beethovenstr. No. 14. A fifth series of lectures will be held from March 7–12, 1910, in the anatomical institute of the Leipzig University.

THE first volume of the report on attendance, compulsory or otherwise, at continuation schools, prepared by the Consultative Committee for the Board of Education, was published (Cd. 4757) a few days ago. The evidence on which the recommendations of the committee have been based will be issued later as a separate volume. The committee was instructed to consider, among other matters, "whether any means, and if so what, can be devised, in respect of rural areas and of urban areas respectively, for securing (i.) that a much larger proportion of boys and girls should on leaving the public elementary school commence and continue attendance at evening schools than at present do so, and (ii.) that employers and other persons or bodies in a position to give effective help shall cooperate in arranging facilities for such attendance on the part of their employees, and in planning suitable courses and subjects for the schools and classes." The witnesses examined by the committee included representatives of employers of labour, of labour organisations, the Public Services, local education authorities, teachers of all grades, inspectors of schools, and persons specially interested in philanthropy. The volume available, with its careful consideration of every aspect of the problem, brings home forcibly to the reader its complexity and importance, and we hope to deal more fully with the whole question in a future issue. Here we will only express satisfaction that the views of enlightened educationists are being brought prominently into public view by reports such as that before us. The resolutions as to leaving age and continuation schools contained in the report of the Education Committee of the British Science Guild (NATURE, January 28, vol. lxxix., p. 382) receive substantial support from the Consultative Committee's conclusions, and it may be hoped that action will be taken before long in the direction indicated by them. Most of the German States have compulsory continuation schools, and Scotland was placed in the same position by its Education Act of last year. It remains for England to adopt a like standard of educational efficiency for its children.

ON the vote of 13,648,792*l*. for the expenses of the Board of Education, Mr. Runciman, President of the Board, made a statement in the House of Commons last week reviewing the state of education in the country. Dealing with technical education, the Minister spoke hopefully. It has been, he said, the object of the Board of Education to make technical education more practical, with a closer bearing on the duties likely to be required from the young men and women who pass through technical classes. In agriculture there is one remarkable fact, namely, that garden classes in elementary schools have been enormously on the increase, and during the last few years the number of these classes which are now carried on in these schools has been trebled. There has been considerable development in technical classes which can be attended by those who intend to enter on an agricultural career, by young farmers and young labourers who at the present time have to spend long and laborious days in the fields or farmhouses, but who are prepared to devote one or two evenings a week to the specialised training which can be provided in technical classes. The cumulative effect of technical training on the young men and women of our country must show itself sooner or later. The great employers have been giving help, said Mr. Runciman, in many parts of the country to those who organise the technical schools. Messenger boys, for instance, are induced more and more to take advantage of the classes in the evening. Some great employers, like the General Post Office, not only give direct inducement to their messenger boys, but put a certain amount of pressure on them to take advantage of classes, and many employers all over the country have made it a condition of service in their works or their great business establishments that the boys should attend a certain number of classes every week. The inspectors of the Board are not only taking a keen interest in the curriculum, but they are also acting as missionaries in what is one of the most useful forms of educational work initiated during the last few years. In concluding his speech, Mr. Runciman pointed out that we still have nothing but an old, temporary building in which our valuable science collection is housed, and he expressed the hope that it may be possible in the near future to give this great collection a better building in which it may be exhibited, and to give to those who have lent or given to that museum some security that the objects which they have given will be well preserved and well exhibited.

THE new engineering buildings of the University of Manchester were opened by Sir Alexander Kennedy on July 15. The general scheme comprises four adjacent buildings; the main block, a three-storied building, contains the lecture rooms, tutorial rooms, drawing offices, private rooms, and research room. The hydraulic and testing laboratory covers the space at the back of this building, and connected to it by a covered way are the thermodynamic laboratories and the workshop. Principal Hopkinson presided at the opening ceremony, and in the course of his remarks pointed out that the example set by the Owens College in 1866, in providing for the professional education of engineers, has been followed by all the